

The background of the cover is a collage of various Southeast Asian scenes. At the top left, a person is seen from behind, wearing a striped sarong, sitting on a boat and handling a large pile of green, leafy vegetables. To the right, a large white ship with a red stripe is docked, with several people standing on its deck. Below the ship, there's a scene of a mangrove forest with water and trees. In the bottom left, a woman wearing a grey hijab and a red jacket is smiling. In the bottom right, a group of people are working in a green rice field.

**ASEAN and Global  
Connections**



**UNIVERSITY OF  
CAMBRIDGE**

Department of Land Economy

## Financial Technology and Inclusion in ASEAN

Dave Fernandez  
Marc Rakotomalala

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Dave Fernandez and Marc Rakotomalala

Singapore Management University

Author's Note

Both authors are from the Sim Kee Boon Institute for Financial Economics at Singapore Management University.

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### Abstract

Financial technology (FinTech) has the potential to be a positive, game-changing force for boosting financial inclusion in ASEAN, as mobile money and greater access to basic financial services have the capacity to improve the economic well-being of households. Indeed, technology has been shown to drive broader increases in economic growth, which itself interacts positively with financial inclusion. In a more direct way, new, specific fintech developments globally and in ASEAN itself can be beneficial for financial inclusion. In this paper, we look at financial inclusion and technology, and how cooperative efforts between ASEAN policymakers, the private sector, and their broader communities can promote financial stability and inclusive growth through the deployment of fintech applications supported by cloud-computing, big data analytics, the Internet-of-Things (IoT), Artificial Intelligence (AI), blockchain technologies and cryptocurrencies.

*Keywords:* Fintech, financial inclusion, economic growth, ASEAN

## Financial Technology and Inclusion in ASEAN

### From Technology to Inclusion

Technology lies at the heart of both economic growth and financial inclusion.

### Technology and Growth

Modern economic literature regarding the role of technology in driving growth is heavily influenced by the work of Robert Solow. Solow's theoretical growth model explains growth using the physical inputs of labor and capital, plus a variable to capture technological change. Notably, Solow's model does not attempt to explain what drives technology. Subsequent to laying out his theoretical model, Solow later empirically tried to measure the determinants of economic growth, leading to a field of research known as "growth accounting." By his calculations, Solow estimated that seven-eighths of US economic growth per capita could be attributed to technological change and only one-eighth to changes in the capital stock<sup>1</sup>.

Over the past half century, the theoretical models have been expanded to make technological change endogenous and the empirical estimations have become more sophisticated<sup>2,3</sup>. Nevertheless, this extensive and still-growing body of theoretical and empirical research enduringly finds a central role for technology in explaining economic growth<sup>4</sup>.

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<sup>1</sup> Solow, R. Technical Change and the Aggregate Production Function. *The Review of Economics and Statistics* 39 (3) (1957).

<sup>2</sup> Romer, P. Increasing Returns and Long-Run Growth. *The Journal of Political Economy*, Vol.94 (5) (1986): 1002 - 1037.

<sup>3</sup> Romer, P. Endogenous Technological Change. *The Journal of Political Economy*, Vol.98 (5, Part 2) (1990): S71-S102.

<sup>4</sup> Abramovitz, M. The Search for the Sources of Growth: Areas of Ignorance, Old and New. *The Journal of Economic History* 53 (2) (1993).

Another way to think about this dynamic is to look at a long historical timeline of economic activity and to take note of important technological innovations. Economic historians have looked at pre-modern economies and their growth for as far back as the past 2,000 years<sup>5</sup> and a striking feature of these estimates is the relative absence of growth for eighteen centuries, followed by a "super exponential" kink. The current period of explosive economic growth has led to research that focuses on a few breakthroughs, termed "general purpose technologies" or GPTs, which lead to many subsequent innovations.

[Figure 1]

**ARPANET/internet & the IT revolution.** A classic example from recent years is the internet, the precursor of which was work done through the U.S. Defense Department's Advanced Research Projects Agency Network (ARPANET). ARPA-funded researchers developed many of the protocols used for internet communication and the internet<sup>6</sup>, in turn, spawned entire new industries and also transformed the way existing industries operate.

More recently, some economists have argued that the productivity slowdown of the 1970s<sup>7</sup> was reversed temporarily as a result of the "IT revolution" that followed the introduction of the internet<sup>8</sup>.

**Artificial Intelligence.** Artificial Intelligence (or AI) is a GPT that many believe may be the largest technology revolution of our times. Arguably, AI is more disruptive than even the

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<sup>5</sup> Maddison, A. *Contours of the World Economy, 1–2030AD*. Oxford: Oxford University Press, 2007.

<sup>6</sup> Hauben, M., Hauben, R., *Netizens: On the History and Impact of Usenet and the Internet*. Los Alamitos, CA: IEEE Computer Society Press, 1997.

<sup>7</sup> Productivity growth is a key determinant of economic growth. Productivity in the U.S. grew rapidly in the post-war era to the early 1970s, slowed during 1970s to early 1990s, and then increased substantially in the mid-1990s; the average annual rate for the three periods are respectively 2.7%, 1.5%, 2.5% — Jorgenson D. W., Ho. M. S., Stiroh, K. J., A Retrospective Look at the U.S. Productivity Growth Resurgence, *Journal of Economic Perspectives*, Volume 22, Number 1, (2008): 3–24.

<sup>8</sup> Basu, S., Fernald, J. Information and Communications Technology as a General Purpose Technology: Evidence from U.S. Industry Data. *Federal Reserve Bank of San Francisco*, Working Paper 2006-29 (2006).

printing press, electricity, the automobile, and the internet in that AI creates an entirely new factor of production. Using recent algorithmic techniques, such as so-called Machine Learning and Deep Learning, AI has the potential to solve complex problems fast and, in doing so, leverage human ingenuity and free up time towards more creative and productive endeavors. It is expected that data-driven technologies will underpin future prosperity. Another important feature of AI is that its tools and techniques are not confined to the lab and are no longer the preserve of researchers like Alan Turing, a pioneer who laid the groundwork for the discipline sixty year ago. Libraries of AI models are on the web. Learning datasets are available for self-service, and, especially, are within the company itself. AI, like the personal computer of the 80s, will very quickly blend into the background and become part of the broad fabric of business and household life.

A consultancy study analyzed<sup>9</sup> the long-term economic impact of AI by modelling the dozen developed countries generating more than half of the world's economic output. This study concluded that AI has the potential to double a country's GDP growth rate by 2035.

### **Technology and Finance**

Related to but separate from the Solow-inspired literature on economic growth and growth accounting is another strand of research on the relationship between finance and growth. Empirically, papers like those of Ross Levine and Sara Zervos consistently find evidence that financial markets provide important services that improve a country's long-run economic growth<sup>10</sup>. Today, technology is revolutionizing the way the finance industry operates, leading widespread use of the term "financial technology" or fintech. Actually, the term financial

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<sup>9</sup> Accenture. Why Artificial Intelligence is the Future of Growth. 2016.



technology has been around for close to fifty years with perhaps its first appearance in a 1972 research report by Hanover Trust which is now part of J.P. Morgan Chase & Co.<sup>11</sup> A recent meta-analysis of research papers concluded that “fintech” can be defined as “*a new financial industry that applies technology to improve financial activities.*”<sup>12</sup> Fintech activities can be classified into the subsectors of payments, alternate forms of lending and credit products, consumer finance, and wealth management. Box 1 describes Kenya's financial innovation and the M-PESA suite.

Aside from these fintech subsectors, technology has also enabled the creation of virtual currencies. Virtual currencies typically use blockchain, or distributed-ledger, technology; there are currently nearly 6,000 virtual currencies, with a pioneer being Bitcoin<sup>13</sup>. Virtual currencies do not need a central authority to exist; however, virtual currencies in the form of Central Bank Digital Currencies (CBDCs), a digital form of fiat money issued by a sovereign entity, have recently been attracting increased attention<sup>14</sup>. At this early stage, the potential impact of virtual currencies including CBDCs on economic growth is unclear.

## Technology and Inclusion

It is widely accepted among policymakers that financial inclusion matters for growth and poverty alleviation. At a macroeconomic level, economic historians Comin and Mestieri estimate

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<sup>10</sup> Levine, R., Zervos, S. Stock Markets, Banks, and Economic Growth. *The American Economic Review*, Vol.88 (3) (1998): 537 - 558.

<sup>11</sup> Bettinger, A. FINTECH: A Series of 40 Time Shared Models Used at Manufacturers Hanover Trust Company. *Interfaces*, 2 (4) (1972).

<sup>12</sup> Schueffel, P. Taming the Beast: A Scientific Definition of Fintech. *Journal of Innovation Management* 4 (4) (2016).

<sup>13</sup> <https://coinmarketcap.com/>, accessed July 22, 2020.

<sup>14</sup> A 2018 survey of 63 central banks representing over 90% of the world's economic output found that about 70% of respondents were currently, or were soon to be, engaged in CBDC work — Barontini, C., Holden, H., *Proceeding with caution – a survey on central bank digital currency*. Bank for International Settlements, BIS Papers No 101 (2019).

that over 80% of income disparity between rich and poor countries can be explained by different rates of technology diffusion since the 1800's<sup>15</sup>. Not surprisingly, financial inclusion, spurred by the technological developments of fintech — with, for instance, the emergence of mobile money and mobile banking as enablers of financial inclusion, has recently moved up the reform agenda with more than 60 countries launching or developing a national strategy<sup>16</sup>.

However, the relationship between fintech, financial inclusion and economic growth is not yet well understood, and research on the topic is relatively sparse. The main reason is that national policies on financial inclusion are recent, and assessing their impact on a country's growth will take time. Studies are also limited by the absence of decade-long time-series on financial inclusion measures. Data limitations are even greater for the direct examination of the relationship between fintech use and financial inclusion.

Yet, from a theoretical point of view, classic economic ideas are helpful in explaining the underpinnings of the new economy of the internet and in describing how digital technologies impact economic development. As early as 1937, Ronald Coase<sup>17</sup> first contributed the notion of transaction costs to economic theory and recognized their crucial importance; one can argue that new digital technologies tend to reduce transaction costs such as those associated with barriers to market participation or information asymmetries.

[Figure 2]

Figure 2 provides a stylized representation of the effects of falling transactions costs<sup>18</sup>. From highest cost to lowest cost, transactions can ideally be ranked; first, those which are too costly to take place in the pre-internet / pre-digital technologies era (exclusion) — e.g. providing

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<sup>15</sup> Comin, D., A., Mestieri, M. If technology has arrived, why has income diverged? *National Bureau of Economic Research* (2013).

<sup>16</sup> <https://www.worldbank.org/en/topic/financialinclusion/overview>, accessed July 22, 2020.

<sup>17</sup> Coase, R. H. The Nature of the Firm. *Economica*, Vol. 4, No. 16 (1937): 386-405.

traditional banking services to remote rural areas; second, those which are becoming cheaper thanks to new technologies (efficiency) — e.g. commerce; and third, those where transaction costs are negligible at the margin (new economy sector and innovation) — e.g. onboarding a new customer once a platform business is up. By lowering transaction costs, digital technologies help promote inclusion, increase efficiency, and foster innovation.

An emerging body of research is showing the potentially significant impact of fintech on financial inclusion which then can affect economic growth. The channels from financial inclusion to growth can be from the supply side (additional income for banks and microfinance institutions (MFIs)) and the consumer side (cost saving from formal payments and interest earned on formal savings). Some research shows the potentially significant impact of financial inclusion on economic growth. Beck et al.<sup>19</sup> have empirically estimated the causal positive impact of financial depth, a concept related to financial inclusion, on greater economic growth and GDP per capita. Sahay et al.<sup>20</sup> also show that financial inclusion increases economic growth, but that macroeconomic gains diminish as financial inclusion and depth increase. Recent research finds that greater financial inclusion can make a 2%- 3% point difference in economic growth<sup>21</sup>.

At the same time, fintech and financial inclusion have also recently moved up the agenda at central banks, as they turn to the policy challenge of inclusive growth, and linkages between financial inclusion and macroeconomic policies become important — for example, greater financial inclusion may impact the interest rate channel of monetary transmission and the role of

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<sup>18</sup> World Bank. *World Development Report 2016: Digital Dividends*. Washington, DC: World Bank, 2016.

<sup>19</sup> Beck, T, Ross, L., Norman, L. Finance and the sources of growth. *Journal of Financial Economics*, Volume 58, Issues 1–2, (2000): 261-300.

<sup>20</sup> Sahay et al. *Financial Inclusion: Can It Meet Multiple Macroeconomic Goals?* Washington, DC: International Monetary Fund Staff Discussion Notes 15/17, (2015).

interest rate in the economy<sup>22</sup>. In short, financial inclusion can affect macroeconomic policies (and growth), which in turn can affect financial inclusion, highlighting the likely interactions between all of the variables in focus in this paper: financial technology, financial inclusion, and economic growth.

While the rapid growth of fintech in recent years is undeniable, whether households and businesses adopt these new technologies cannot be taken for granted. Additionally, the degree to which they decide to adopt these technologies can determine the link between fintech and inclusion. A recent study by Loh shows that in high-tech Singapore, households exhibit status-quo bias, preferring to use ATMs for point-of-sale services and funds transfers that could be done digitally<sup>23</sup>. Using a natural experiment of customers who experience the closure of their favorite ATM, Loh finds that this “nudge” can help customers overcome their status quo bias and adopt the fintech innovation, assuming they have choices. In the next section, we illustrate some structural and behavioral challenges to financial inclusion in ASEAN as we explore why mobile money, although created in the Philippines, did not gain broad consumer acceptance, while it is ubiquitous in Kenya and has overtaken other traditional payment systems — see Box 1. ASEAN countries can learn from each other, and other regions of the world, but distinctive country-specific approaches, calibrated to their own country strategies, may be warranted.

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<sup>21</sup> Lipton, D. “Central Bankers and Inclusive Growth: Building a Framework for Financial Inclusion.” April 22, 2017. Accessed July 23, 2020. <https://www.imf.org/en/News/Articles/2017/04/22/sp042217-central-bankers-and-inclusive-growth-building-a-framework-for-financial-inclusion>

<sup>22</sup> Yetman, J. *Adapting monetary policy to increasing financial inclusion*. Bank for International Settlements (2017).

<sup>23</sup> Choi, H., Loh, R. Physical frictions and digital banking adoption. *Sim Kee Boon Institute for Financial Economics, Singapore Management University* (2020).

### **Technology and Inclusion in ASEAN**

The rest of this paper examines the specific case of ASEAN, and how developments in the region's fintech industry are affecting financial inclusion. First, we describe the region's significantly diverse levels of economic development and financial inclusion. Second, we examine the role of start-ups and regulation in ASEAN's fintech industry, and provide some leading case studies. Third, we address the future role of "super apps" in ASEAN's fintech landscape. Fourth, we frame digital innovation within the broader context of ASEAN Connectivity, and its role as one of five strategic areas with the potential to drive greater competitiveness and inclusiveness.

### **ASEAN's Heterogeneous Current Conditions**

The Association of Southeast Asian Nations (ASEAN), a loose federation of states, similar in many ways to the European Economic Community of the 1960s following the 1957 Treaty of Rome, is a regional organization aimed at bringing economic integration to its member states. It is culturally and economically diverse, and a vast regional market.

Its young<sup>24</sup> and dynamic 648 million people live in ten states, as small as Brunei with its population of 428,000 and as large as Indonesia, with 268 million. They speak a dozen main languages; they live in democracies in Indonesia and the Philippines, in the People's Democratic Republic of Lao, in the Socialist Republic of Vietnam, or in a constitutional monarchy in Thailand. There are Malaysia and Indonesia and their Muslim population, Catholic Philippines, and Buddhist Myanmar; and Singapore and its GDP per capita of USD 65,000 and Cambodia's of USD 1,600.

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<sup>24</sup> All countries have a median age of about 30 year or less, except Singapore and Thailand in the 40s.

With ten countries at various stages of development, the impact of technology in ASEAN is, not-surprisingly, vastly different from one country to the other, given the wide variation in income-levels, infrastructure, and technology adoption.

Financial inclusion refers to the delivery of financial services and products to all, and especially to the unbanked or underserved. Research shows<sup>25</sup> that tackling this challenge could increase GDP by between 9% and 14% in Indonesia and the Philippines, and propel Cambodia's GDP as high as 32%.

A marker for financial inclusion is account statistics on access to, and usage of, formal or informal financial services. Financial inclusion matters not only for its potential for improving socio-economic outcomes and influencing the effectiveness of macroeconomic policies, but also for highlighting the underlying technologies which increasingly enable it. Digital financial services, mobile money services, payment cards, and other fintech applications are today supported by cloud-computing, big data analytics, IoT, AI, blockchain technologies and cryptocurrencies.

While Singapore, Malaysia, and Thailand have an adult population with significant access to formal or informal<sup>26</sup> financial services (more than 80% have an account), access in CMLV (Cambodia, Myanmar, Laos, Vietnam) is low, less than 30%, and half of adult Indonesians, a staggering 92 million people, still have no access, even though the country has made tremendous progress over the few past years — 20% with no access to financial services in 2011, and 36% in 2014 (Fig. 3). Indonesia may face the problem of geographic dispersion with more than 17,000 islands and a landmass similar in size to 2,600 times that of Singapore, or one-fifth of that of China; however, a large size in itself is not an insurmountable barrier, as China

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<sup>25</sup> Asian Development Bank. *Accelerating financial inclusion in South East Asia with digital finance*. Metro Manila: Asian Development Bank, 2017.

demonstrates with 80% account ownership. The heterogeneity of financial services provided is also meaningful across countries. Countries such as Singapore, at the cutting edge of financial technology, provide a full range of digital solutions — payments, savings, credit, insurance, and wealth management, while others, e.g. Cambodia or Laos, simply aim to provide access to basic financial services such as the ability to store, send, or transact money — a given in advanced economies.

[Figure 3]

Mobile phones increasingly encapsulate these transformative technologies and services; mobile money accounts allow people to store money, send electronic payments, receive remittances, or participate, for example, in agricultural markets. These originally simple communication tools have morphed into affordable service platforms, delivering innovative applications and transforming lives in the developing world.

In ASEAN, digital enablement is largely driven by the supply side, where regulatory and public policy actions play a significant role in trying to create a favorable environment. For instance, the Indonesian government launched in 2016 its National Strategy for Financial Inclusion whose main objective is to reduce the unbanked to 25% of the adult population within three years; its focus is on those unreachable by formal financial services — low-income communities (lowest 40%), small and micro businesses (e.g. entrepreneur with limited resources for business expansion), and cross-community groups such as those in outlying islands, women<sup>27</sup>, or students<sup>28</sup>. The strategy includes fintech branchless banking programs such as *Laku Pandai*<sup>29</sup>, which could help overcome the country's geographical barriers to financial inclusion.

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<sup>26</sup> An example of an informal financial service would be pawn shops.

<sup>27</sup> In 2014, only 37% of Indonesian women had an account at a formal financial institution.

<sup>28</sup> Students and youth estimates are about 107 million, or 42%, of Indonesia's population in 2015.

<sup>29</sup> Lit. "smart behavior".

A short time after, an Indonesian financial services authority, the OJK<sup>30</sup>, developed regulations for digital financial services delivered through fintech, as well as rules for peer-to-peer lending platforms.

In light of the recent push to increase financial inclusion, and clients to migrate towards digital financial services, Indonesian banks have been changing their strategies. Recent surveys<sup>31</sup> indicate that Indonesian banks are likely to invest in technology, as they view technology as the primary driver of business transformation. And more than a quarter of respondents express concern that fintech players will disrupt their bank's business by intensifying competition. Box 2 illustrates how, in the Philippines, UnionBank pursues its digital transformation to service the unbanked and the underserved.

For the ASEAN regulator, finding a balance between the benefits of increased competition and the risks of disrupting traditional banking is important, and the Indonesian government is encouraging synergies and collaboration between traditional banks and fintech companies. However, how will technology-based new entrants behave, by disrupting or collaborating with incumbents?

The National Bank of Cambodia has answered this question by setting the infrastructure for its CBDC, the Bakong, with the cooperation of a consortium of a dozen domestic banks, where the aim is *"to create financially inclusive ecosystems that all the stakeholders in the industry can benefit from"*<sup>32</sup>. Box 3 provides an overview of the Bakong CBDC.

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<sup>30</sup> OJK: Otoritas Jasa Keuangan.

<sup>31</sup> PwC. Indonesia Banking Survey 2017. PwC Indonesia, 2017.

PwC. Indonesia Banking Survey 2018. PwC Indonesia, 2018.

<sup>32</sup> Ms. Chea Serey, National Bank of Cambodia director-general, January 2020.



### **ASEAN's Fintech Start-Ups**

Typically, we observe that fintech subsectors are at different stages of maturity within the region and within countries. Some of the world's largest fintech unicorns are in the Payments subsector, such as Stripe from the US; so, it is not surprising that the ability to transact is also the starting point for markets in ASEAN. As one could expect with the process of financial inclusion, activity starts with payments, then moves to alternate forms of lending and credit products, then consumer finance, and finally wealth management.

[Figure 4]

Spurred by the Indonesian government's National Strategy for Financial Inclusion, Indonesia has a booming payments subsector with 62 payments start-ups. Singapore is ASEAN's fintech hotspot with about 100 fintech companies per million capita, and a mature sector encompassing the whole spectrum from Payments to Wealth Management; Singapore companies are typically bred to one day expand overseas, after being incubated in the small domestic market — Boxes 4 and 5 describe the markets of two Singapore fintech start-ups expanding globally, and the particular role they play in fostering financial inclusion. Malaysia is the emerging fintech hub; it takes advantage of its geographic proximity with neighboring Singapore to capture innovation and talent spillover effects. Moreover, it is the low cost cousin of Singapore with a cost of living a third that of Singapore. With an annual USD 30 billion worth of remittances in the Philippines, the remittance subsector sees a lot of traction in the Philippines.

Key investors are from Silicon Valley but domestic ASEAN venture capitalists are equally active, if not more.

There is a strong policy support for promoting innovation and financial inclusion, as indicated by the now prevalence of regulatory sandboxes; sandboxes are mechanisms for

developing regulation allowing fintech entrepreneurs to safely test their new products, under looser rules. Thailand has already established rules, even though its fintech sector is just nascent.

Indonesia and Philippines account for more than half of ASEAN population. Indonesia has undergone a rapid transformation, from high school science education<sup>33</sup> to adults' financial inclusion. However, less than 1% of Indonesians has ever used mobile money, 99% of all bills are paid in cash, even though 51% of adult population has access to internet and mobile subscription rate is 142% of the country's population. In the Philippines, twenty years after having inventing mobile money, Filipinos still heavily rely on cash while the country tops the world internet usage with 10 hours a day; the reasons for this reliance on cash are numerous<sup>34</sup>. To cite a few: cash is perceived as inexpensive and convenient while digital payment solutions are still costly relative to income levels of a large swath of the population; lack of trust, concerns about fraud, and the absence of recourse mechanisms hamper the shift to digital payments; lack of information on e-money platforms as half of the population is unaware of their existence; for businesses, the incentives to switch away from checks are not overwhelming while suppliers are still mainly paper-based; the large size of the informal economy, officially estimated at 35% of GDP but twice that size according to commercial bankers when taking into account tax avoidance activity<sup>35</sup>; however, the overarching reasons are financial exclusion — two-thirds of Filipinos do not own an account or digital wallet, and the limited infrastructure outside urban centers like Metro Manila — consumers experience dropped calls due to insufficient mobile connectivity that stands at a cell tower density of 1.5 4G stations per 10,000 subscribers, the lowest 4G availability in ASEAN<sup>36</sup>. Three years ago, Jack Ma of Alibaba addressed a Filipino

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<sup>33</sup> OECD. *Indonesia Country Note – Results from PISA 2015*. Paris: OECD, 2016.

<sup>34</sup> Hokans, J. *Lessons from the Philippines' Journey to Digital Payments*. Better Than Cash Alliance, 2015.

<sup>35</sup> Hokans, J. *Country Diagnostic: Philippines*. Better Than Cash Alliance, 2015.

<sup>36</sup> <https://www.opensignal.com/reports/2016/08/global-state-of-the-mobile-network>, accessed July 25, 2020.

audience<sup>37</sup>: “*Philippines, I think you have the opportunity to make the best TechFin or FinTech in the world.*” It is a long way to realize this vision but various actors, from the private sector to the government, are working to make the country’s financial sector more inclusive and efficient.

In 2018, there were 62 payments start-ups in Indonesia, and 47 in alternate forms lending and credit products. This is perhaps not surprising, as the use of informal financial services is commonplace. Only 17% of the adult population borrowed money from a financial institution in 2017, but most borrowed from family, friends, or neighbors. Indonesians also see the informal saving or lending groups, known as “*arisan*”<sup>38</sup>, as a trusted loan-distribution system. An *arisan* is a social club, akin to an informal credit union, whose members are bound by trust as well as similar backgrounds or interests. Meeting at each member’s home in a rotating fashion, a lottery system ensures that each member has the chance to be an *arisan* holder. The *arisan* helps fund, typically through an interest-free loan from peer members, the purchase of the then-*arisan* holder, e.g. a wedding, household appliances, a business venture, school fees, expenses that are otherwise difficult to fund through traditional bank loans and other forms of credit. In the Philippines, only 10% of the adult population has borrowed money from a financial institution in 2017, but 41% borrowed from family, friends, or neighbors — this is the highest rate in ASEAN<sup>39</sup>. These habits are opportunities for fintech companies to create new customers by incorporating these local aspects into their services. One such company is Mapan<sup>40</sup>, an Indonesia-based technology social enterprise that builds on *arisan*’s strong social bond to help lower income communities become financially self-sufficient and access otherwise inaccessible products and services through its platform. Mapan's business model does not rely on funding or

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<sup>37</sup> <https://www.youtube.com/watch?v=OZK-SSwbqAY>, accessed July 25, 2020.

<sup>38</sup> Lit. “social gathering”.

<sup>39</sup> World Bank. *The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution*. Washington, DC: World Bank, 2018.

investment but on its buying power or its own manufacturing of products by local enterprises. With the leverage of technology, Mapan has over 3 million members, 250,000 agents and 115 branch offices across rural areas of Java and Bali. Founded in 2009, it has been acquired by Indonesia fintech giant GoJek in 2017.

With an annual USD 30 billion worth of remittances in the Philippines, this subsector sees a lot of traction with ten start-ups. It is also worth noting the active Cryptocurrency and Blockchain subsector with twenty start-ups. Here again, one sees the important role of the regulator in spurring or curbing fintech innovation. The Philippines Central Bank recognized<sup>41</sup> in early 2017 the potential for virtual currencies systems to *"revolutionize delivery of financial services, particularly for payments and remittance, in view of their ability to provide faster and more economical transfer of funds, both domestic and international, and may further support financial inclusion."*

There are five Indonesian unicorns — these privately held start-up companies valued at over USD 1 billion. Gojek, a ride-hailing and a "Super App"; Tokopedia, and its tagline, *"Democratizing commerce through technology"*; Ovo, a digital platform for financial services; Bukalapak, e-commerce and a platform for mom-and-pop stores, such as *warungs*; Traveloka, travel and life style services.

Gojek and Tokopedia help highlight some key points of the largest Indonesian unicorns, and conjecture how their future could impact people and businesses in some scenarios, and how these scenarios could also develop in the rest of ASEAN.

[Figure 5]

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<sup>40</sup> Mapan <https://www.mapan.id/insidemapan/>, accessed July 25, 2020.

<sup>41</sup> Espenilla, N. *Guidelines for Virtual Currency (VC) Exchanges*. Circular No 944 Series of 2017. Bankgo Sentral Ng Pilipinas, 2017.

At a USD 5 billion valuation in 2019, Gojek would be comparable to the total market capitalization of the Travel & Leisure companies in the Consumer Services sector of the Indonesian Stock Exchange<sup>42</sup>. It has an impressive array of global investors, including Indonesia's Astra, US's Google, Singapore's Temasek, and China's Tencent. Tokopedia is not outdone with US's Sequoia Capital, Japan's Softbank Group, and China's Alibaba. The first Indonesian unicorn, Gojek started as a simple ride-hailing service in 2010 with twenty motorbike drivers; it added three services in 2015, and today it has more than twenty services -- from food, to groceries, to massages. In 2017, it acquired three large fintech firms in Indonesia<sup>43</sup> in order to expand its payments business. And in 2019, it bought an AI recruiting platform in Bangalore, India<sup>44</sup>.

### **The Role of “Super Apps” in ASEAN**

Tokopedia's best-known product is its marketplace for merchants and buyers. It also provides digital financial products such as credit, utility payments, and credit cards. More recently, Tokopedia offers more sophisticated fintech products — wallets, insurance products, credit scoring capabilities, etc.

Like WeChat of Tencent and China, these apps are on their way to becoming "Super Apps", or multi-purpose platforms. In most markets, smartphone users have 80 apps or more on their phone, and use about 40 of them each month<sup>45</sup>; in China, users can do everything in the WeChat Super App, facilitating its adoption — pay bills, book doctor appointments, hail taxis, hold video conferences, access bank services, or play games. However, in the case of WeChat, it

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<sup>42</sup> Author's calculations. <https://markets.ft.com/data>, accessed September 16, 2019.

<sup>43</sup> Kartuku, Midtrans, and Mapan.

<sup>44</sup> AirCTO.

is increasingly difficult for users to opt out given the application's dominance, state censorship of foreign alternatives, and further integration into users' daily life by progressively becoming China's digital ID system. A Super App is a data-gathering device. In the age of cloud-computing, big data analytics, and AI, Facebook is a marketer's go-to place; however, a Super App is a marketer's dream. It is also a banker's dream. One key competitive advantage of banks is Know Your Customers' businesses (KYC), because banks lend them money; in essence, banks have access to information. This could change as a Super App has the potential to erode banks' key competitive advantages — KYC, access to funds, reputation, and regulatory barriers.

We already touched on KYC with the Super App and its data being a banker's dream. We also have highlighted a Super App's access to capital. A Super App has superior information, gathered across multiple touch-points, online and offline. As important is its ability to mine customers' data for estimating and calibrating new consumer credit models via machine-learning algorithms, and create, thanks to information asymmetry reduction, new, viable and profitable markets for the under-banked, or less capital-intensive credit businesses with alternative forms of lending<sup>46</sup>. Not surprisingly, Facebook saw the value of its platform for payments and financial inclusion, among other motivations, when it announced in 2019 its intention to create Libra, a digital currency "*for billions of people [to use] around the world*"<sup>47</sup>.

When it comes to reputation, a Super App's large customer base is already won, and offering an additional service is the customer's expectation. Take Tokopedia and its large customer base of reportedly four million merchants and 80 million monthly active users cutting through Indonesian society. We do not have the details of Tokopedia's functional and technology

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<sup>45</sup> App Annie. 2017 Retrospective Report. <https://www.appannie.com/en/insights/market-data/app-annie-2017-retrospective>, accessed September 16, 2019.

<sup>46</sup> E.g. peer-to-peer (P2P) lending.

"stacks" but one can safely assume that its business strategy and fintech product offering will expand further, with Ant Financial's fintech platform and Alibaba's multiple investments in the company<sup>48</sup>. Alibaba's spinoff, Ant Financial, offers the entire spectrum of financial services from payments, to credit, to banking, to wealth management (Fig. 6). After all, these technical capabilities at Alibaba and Tencent, are in part what is behind China's impressive trajectory towards financial inclusion<sup>49</sup>.

[Figure 6]

How the story will play in a particular jurisdiction, greatly hinges on the regulatory environment, the so-called RegTech, as well as structural factors such as infrastructure development. Again, if we look at China's experience, the country is a leader in fintech because the policymaker, among other measures, has provided the regulatory space for innovations in digital finance<sup>50</sup>, and has allowed the establishment of new types of financial service providers; the country's trajectory towards universal financial inclusion, to achieve a "*moderately prosperous society*", *xiǎokāng shèhuì*, 小康社會<sup>51</sup>, has been impressive over the past 15 years, as account ownership is now at 80%, a level comparable to that of other G-20 countries<sup>52</sup> — although, in absolute terms, this means that about 230 millions of adults are still unbanked. Earlier, we pointed to the roles of the National Bank of Cambodia and the Philippines Central Bank in allowing virtual currencies systems to develop. In Singapore, the fintech leader in

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<sup>47</sup> The Libra Association. *Libra White Paper v2.0*, <https://libra.org/en-us/whitepaper>, accessed August 10, 2020.

<sup>48</sup> Investments in 2017 and 2018.

<sup>49</sup> World Bank. *Toward Universal Financial Inclusion in China*. Washington, DC: World Bank, 2018.

<sup>50</sup> State Council. *Plan for Advancing the Development of Financial Inclusion (2016-2020)*, <http://pubdocs.worldbank.org/en/335801453407732220/ENGLISH-Advancing-Financial-Inclusion-in-China-Five-Year-Plan-2016-2020.pdf>, accessed July 28, 2020.

<sup>51</sup> Ibid.

<sup>52</sup> Ibid, 32.

ASEAN, "*regulation [runs] alongside innovation*", and regulation is calibrated<sup>53</sup> to the risk to the financial system posed by new technologies, with materiality and proportionality tests.

An important issue on regulation is that of data sovereignty, and more specifically for Indonesia and Vietnam in ASEAN, data localization. Data sovereignty is the notion that data is subject to the laws of the jurisdiction where it is collected; the idea became important after Edward Snowden, an American whistleblower, revealed highly classified information about the US NSA global surveillance program<sup>54</sup>, collecting data from people around the world. Data localization goes further than data sovereignty. It requires that data about a country's residents must be collected, processed, and stored onshore, before possibly being transferred offshore.

The implications of such laws are important for e-Commerce and fintech. Besides being seen as protectionist measures, they may slow the speed of innovation because of the relative lack of local data centers and associated ecosystems. For example, Amazon Web Services (AWS), a major cloud-computing platform provider, was still not present in Indonesia for most of 2019 because of the country's data localization laws and the inefficiency of running local data centers versus regional ones, while the local volume is still small; only in October 2019 was the regulation amended<sup>55,56</sup> and AWS announced local data center opening for early 2022. That said, following its internationalization strategy in Asia, Alibaba is already providing cloud-computing services in Indonesia.

So, if or when, this Super App player scenario disrupting the incumbent financial companies develops, the customer base, cutting through all social strata and groups, would be

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<sup>53</sup> Menon, R. Singapore's FinTech Journey – Where We Are, What Is Next? *Monetary Authority of Singapore, FinTech Conference*, 2016.

<sup>54</sup> PRISM, United States National Security Agency.

<sup>55</sup> Indonesia Government Regulation 71 amending 2012 Government Regulation 82 of Concerning Electronic System and Transaction Operation.

<sup>56</sup> <https://aws.amazon.com/events/asean-startup/aws-services-in-indonesia>, accessed July 24, 2020.



better off because of access to a wider array of available financial products, in exchange for handing off its entire personal data to a central authority — much like Facebook is offering its platform for free in exchange for its users' personal data. Is this a completely desirable outcome? What are the incentives for this central player to behave well, when the greater incentive may be to exploit its market power?

The answer is that there may be a role to play for alternative lenders, but with an infrastructure that combines decentralization and fintech, and that is enabled by blockchain technology. Alternative lenders could achieve an even greater purposeful finance, i.e. improving people's lives, in this scenario of decentralization of control among network participants, programmable economy, sharing economy, selective data disclosure, and asset tokenization. The Super App scenario is developing in Indonesia; will it also happen in the rest of ASEAN?

### **ASEAN Connectivity**

At the end of the colonial rule, some observers were predicting that Southeast Asia would collapse as new national states were coming into being. In 1962, British historian and geographer C.A. Fisher<sup>57</sup> colorfully and metaphorically described the region as the “*Balkans of the Orient*”, as both regions were “*areas of transition and instability*” sitting on “*cultural and political fault zones*”. While ASEAN’s current heterogeneity has previously been highlighted, on the eve of self-determination, even more obstacles indeed lay ahead, domestic and international. Within borders, vastly differing ethnic groups, values, religions, and languages were challenges to nation building and national unity, and in a deeply divided cold war environment and its alliance system, region building faced its own crisis as an ideological war in Vietnam claimed lives and spread to neighboring Cambodia and Laos. Against all odds, Southeast Asia showed resilience against

changing geopolitical conditions and economic shocks, and embraced globalization. For instance, “*the minute city state of Singapore, [...] like a head without a body*”<sup>58</sup>, i.e. without access to natural resources, would undergo a rapid industrialization and achieve an exceptionally high average growth rate of more than 8% from the 1960s to late 1990s.

In the 21st century, in the wake of the 1997 Asian Financial Crisis that would rapidly engulf and badly affect the region, ASEAN envisioned the ASEAN Economic Community (AEC) to intensify cooperation and better respond to regional and global shocks, with economic integration as the end goal. Blueprints and master plans will articulate the vision of a highly integrated and inclusive region.

The Master Plan for ASEAN Connectivity 2025<sup>59</sup> is “*to achieve a seamlessly and comprehensively connected and integrated ASEAN that will promote competitiveness, inclusiveness, and a greater sense of Community*”, with deliverables across five strategic areas: sustainable infrastructure, digital innovation, seamless logistics, regulatory excellence, and people mobility — digital innovation identified as a significant potential source of economic activity, supported by a backbone infrastructure, and regulatory frameworks for new digital services to ensure that gains are inclusive. Effective implementation to realize the vision and go beyond a narrative are critical, but ASEAN cannot ignore the technological change and digital technology global megatrends that will impact its economies and its people<sup>60</sup>.

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<sup>57</sup> Fisher, C. Southeast Asia: The Balkans of The Orient? *Geography*, Vol. 47, No. 4 (1962): 347-367

<sup>58</sup> Ibid.

<sup>59</sup> ASEAN. *Master Plan for ASEAN Connectivity 2025*. Jakarta: ASEAN, 2016.

<sup>60</sup> A consultancy estimated that, by 2028, technology will displace 28 million workers and alter jobs in ASEAN, underlining the need for a strategy to produce skills that are complemented by, rather than substituted for, technological change. Oxford Economics. *Technology and the future of ASEAN jobs*. 2018.

### **Conclusion**

In this paper, we looked at financial inclusion and technology in ASEAN against the backdrop of the region's digital economy unfolding at an unprecedented pace — its digital transformation spurred by technological diffusion, the spread of ideas, innovation, and shaped by responsive regulatory frameworks. The signs are visible and plenty — innovative start-ups using technology to grow, tech social enterprises benefiting communities, tech unicorns delivering gains for consumers, and increasing financial inclusion driven by policy and market opportunities. We highlighted the interactions and linkages between financial technology, financial inclusion, and economic growth. We underlined how cooperative efforts between ASEAN policymakers, the private sector, and communities attempt to promote financial stability and inclusive growth through the deployment of fintech applications supported by cloud-computing, big data analytics, the Internet-of-Things, artificial intelligence, blockchain technologies and cryptocurrencies. The picture presented here remains nonetheless incomplete, not least considering the recent, dynamic, and evolving subject matter we covered.

Fintech can be a positive, game-changing force for boosting financial inclusion in ASEAN, as mobile money and greater access to basic financial services, for instance, have the capacity to improve the economic well-being of households. However, the overarching conclusions of this paper are that ASEAN countries can learn from each other, and other regions of the world, but distinctive country-specific approaches, calibrated to their own country strategies, may be warranted. Further, fintech and technological change are not easy panaceas for economic development but factors among several, such as infrastructure, regulatory environment, or human capital development.

While we examined the technology megatrend, which cuts across national boundaries, deglobalization may be an emerging trend with the potential to reshape social, economic, technological, and geopolitical conditions; furthermore, the post-Covid-19 pandemic world may settle in a new normal. A regionalization of the world would certainly present new challenges, and could slow economic and inclusive growth. While recognizing and managing the risks borne out of more transformative changes, the new normal should be an opportunity for fintech and technology to exert an even greater impact and play a greater role in ASEAN's collective response, as Covid-19 forces and accelerates the digital transformation agenda.

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<sup>51</sup>*Ibid.*

<sup>52</sup>*Ibid.*, 32.

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<sup>61</sup>World Bank Global Financial Development Database, <https://databank.worldbank.org/reports.aspx?source=1250&series=GFDD.AI.25>, accessed August 5, 2020.



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<sup>66</sup>Ibid, 32.

<sup>68</sup>Safaricom. Safaricom Annual Report and Financial Statements 2013.

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## Boxes

Box 1 *Kenya's M-PESA Mobile Money*

The Philippines was the first country to introduce mobile money back in 2001 with Smart Communications, Inc., a domestic telecommunications provider reaching out to underserved markets. Globe Telecommunications, another domestic Mobile Network Operator (MNO), followed in 2004. The digital platforms enabled their users to transfer funds, pay bills, purchase goods, and remittances to flow via SMS. However, growth was slow, owing to idiosyncratic structural and behavioral challenges, and, twenty years later, the share of digital payments is negligible, Filipinos still rely heavily on cash, and two-thirds do not own a financial services account or digital wallet.

The story played out differently in the East African country of Kenya. In 2007, in this country of 39 million people, but only 4.6 ATMs per 100,000 adults<sup>61</sup> and 1360 bank branches<sup>62</sup>, 85% of the population did not have access to banking services. Safaricom, the country's leading MNO, identifying an opportunity to address last-mile distribution of financial services through low-cost digitally enabled access points, responded to a market need by launching M-PESA<sup>63</sup> — originally a money transfer service built on top of the mobile phone. Unbanked and underserved people could now send, receive and store money using a simple, secure, and cheaper than cash solution.

Starting with the readily available market of urban-rural remittances, M-PESA rapidly became more ubiquitous and part of Kenyans' daily lives. By 2011, M-PESA had 15 million

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<sup>61</sup> World Bank Global Financial Development Database, <https://databank.worldbank.org/reports.aspx?source=1250&series=GFDD.AI.25>, accessed August 5, 2020.

<sup>62</sup> Author's calculations, and World Bank Global Financial Development Database, <https://databank.worldbank.org/reports.aspx?source=1250&series=GFDD.AI.02>, accessed August 5, 2020.

subscribers<sup>64</sup> — or 63.5% of the adult population, a 39,400 strong agent network countrywide (the traditional bank equivalent of a branch); in 2018, mobile money transactions were equivalent to nearly half of Kenya's GDP<sup>65</sup>. Financial inclusion among Kenyans, as measured by account ownership, increased rapidly from 42% in 2011 to 82% in 2017, with no urban-rural divide<sup>66</sup>.

More financial innovation beyond payments came with the launch of the also largely popular M-Shwari product<sup>67</sup> in 2012, instantly bringing traditional banking services such as credit and interest-bearing savings accounts to 22 million M-Pesa users. Four months after its launch, M-Shwari boasted 1.2 million banking customers<sup>68</sup>, and 19.5 million accounts were created by July 2017 — more than the accounts of the next two largest bank competitors combined<sup>69</sup>.

The effect of mobile money on household welfare has famously been brought to everyone's attention by Suri and Jack<sup>70</sup> who find that mobile money causes economic development, and who estimate that access to the Kenyan mobile money system M-PESA increased per capita consumption levels and lifted 194,000 households, 2% of Kenyan

<sup>63</sup> M-PESA: M for Mobile, pesa meaning money in Swahili.

<sup>64</sup> Safaricom. Safaricom Annual Report and Financial Statements 2012.

<https://www.safaricom.co.ke/investor-relation/financials/reports/annual-reports>, accessed August 5, 2020.

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<sup>69</sup> Cook, W., McKay, C. Banking in the M-PESA Age: Lessons from Kenya. *CGAP Working Paper*. Washington, D.C. (2017).

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households, out of poverty. At the firm-level, Beck et al.<sup>71</sup> find that M-Pesa helps entrepreneurs access trade credit and that it has the power to promote economic development — its availability increases the macroeconomic output of the Kenyan entrepreneurial sector by as much as 0.5%. However, these findings do not imply that fintech and technological changes are easy panaceas for economic development but factors among several, such as infrastructure, regulatory environment, or human development.

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<sup>71</sup> Beck, T., Haki P., Ravindra R., Burak R. U. Mobile Money, Trade Credit and Economic Development: Theory and Evidence. Discussion Paper No. 2015-023. *Tilburg, Netherlands: Tilburg University* (2015).

*Box 2 The Digital Transformation of UnionBank of the Philippines*

The largest banks in the Philippines have generally not made large investments in internal digital transformations. Philippine banks only spend around 2% of their operating incomes on digital upgrades compared to the 7% spent by ASEAN leaders in Singapore and Malaysia<sup>72</sup>. The exception is UnionBank, the country's bank with the reputation of being the most tech-savvy, and whose stated end goal is achieving "*greater access to financial services for all Filipinos, particularly the unbanked and the underserved*"<sup>73</sup>. Likening itself to an IT company with a banking franchise, the bank, through its own fintech subsidiary, strives to attract new customers by creating new communities and ecosystems.

Rural banks, microfinance entities, and cooperatives in the Philippines often offer the only physical financial presence for those living in the provinces. By serving what would traditionally be seen as rivals, UnionBank takes care of the digital banking aspects of these lenders to farmers, fishermen, and microenterprises so that they can focus on their core business and bring financial services within the reach of more Filipinos. For example, through UnionBank's platform utilizing blockchain technology, the process of domestic remittances from one rural bank to another is streamlined, cross-border remittances made by overseas Filipino workers is a matter of minutes rather than days, and rural banks can connect to the country's main banking networks and grow their markets<sup>74</sup>.

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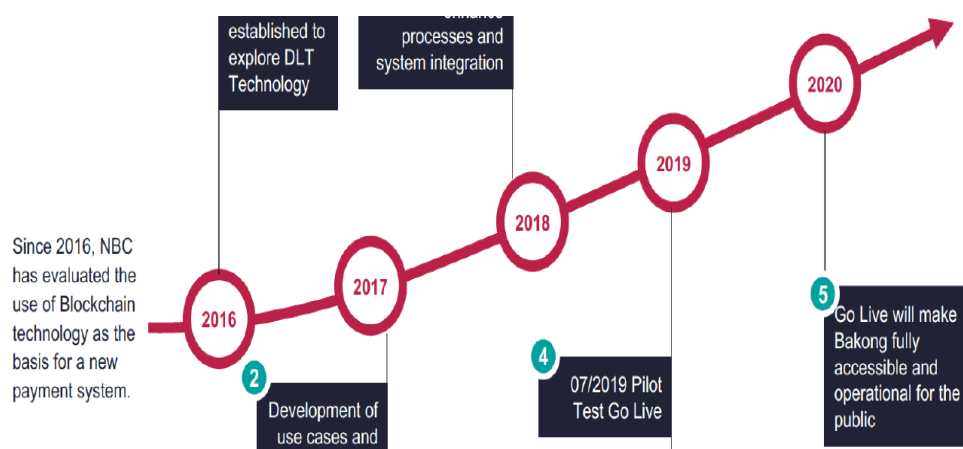
<sup>72</sup> Fitch Ratings Financial Institutions. <https://www.asia-first.com/newsletter/philippine-banks-lag-behind-asian-rivals-in-digital-race.html>, accessed August 4, 2020.

<sup>73</sup> The UnionBank of the Philippines, <https://en.pnasia.com/releases/apac/unionbank-is-2020-model-bank-for-financial-inclusion-278664.shtml>, accessed August 4, 2020.

<sup>74</sup> "UnionBank bags 2020 Model Bank Award for Financial Inclusion." Manila Bulletin, April 12, 2020. Accessed August 4, 2020. <https://mb.com.ph/2020/04/22/unionbank-bags-2020-model-bank-award-for-financial-inclusion/>

### Box 3 *The National Bank of Cambodia and its Bakong CBDC*

The regulator set up the infrastructure for a digital local currency in the dollarized economy of Cambodia. The banking private sector now has the ability to reach the poor in an economic and profitable way, by offering digital bank accounts and means of payment in local currency. Cross-border trade activities are also facilitated as visiting tourists from neighboring Thailand can use the new currency.



The Bakong journey

Source: National Bank of Cambodia, November 2019.

### Bakong key considerations

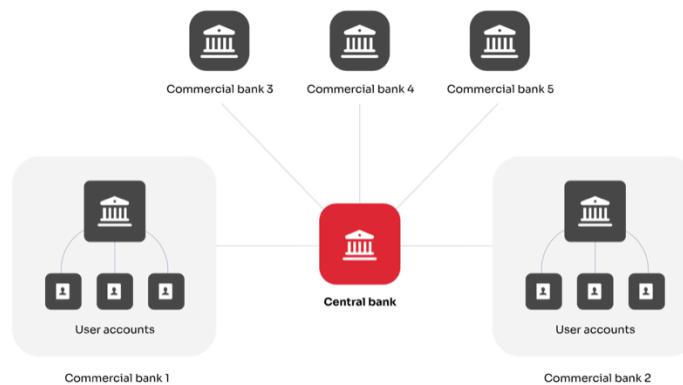
- Financial Inclusion
  - Access to financial services, especially in rural areas
  - Respond to real demand for wider use of electronic payments
  - Mobile phone penetration greater than bank accounts ownership
  - Build a cashless society
- Use of the Khmer Riel (KHR) for retail payments
  - Build a non-dollarized economy
- Resolve issues of interconnectivity and interoperability
  - Banks and payment service institutions operate on a common platform
- Real-time-gross settlement
  - Immediate finality of payments through DLT
  - Reduced burden on liquidity management and regulatory compliance for existing payment service providers



- Use of DLT to attain efficiency
  - Better service at lower transaction costs

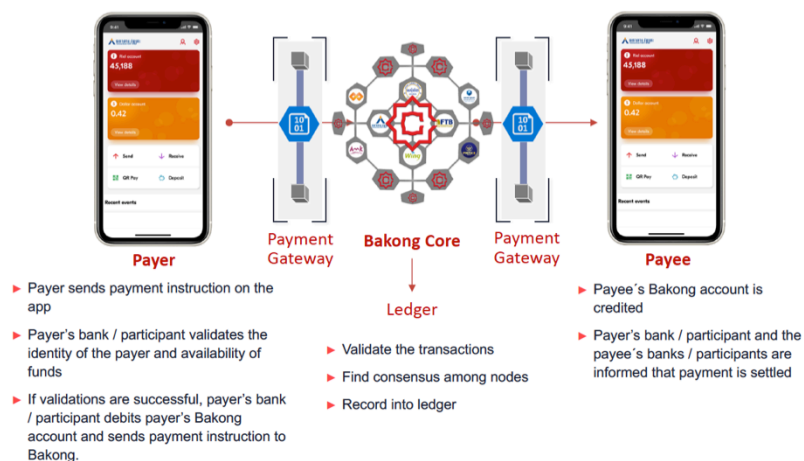
Technically, Bakong should be thought more as a payment gateway rather than a "pure" retail CBDC, as there is, for example, no access to the balance sheet of National Bank of Cambodia, nor monetary policy:

- Universal; for banks, firms and households
- Co-existence with present banking system
- Available 24/7
- Electronic and DLT-based; permissioned system
- National-currency denominated, 1:1 exchange rate with KHR
- USD payments also



Bakong architecture

Source: National Bank of Cambodia, November 2019.



Bakong functional overview

Source: National Bank of Cambodia, November 2019.

*Box 4 Remittances, Poverty alleviation, and Technology — a Singapore Fintech*

About 270 million people live outside of their countries of birth, and over 750 million migrate within their countries<sup>75</sup>. Remittances are transfers made by migrants to families or communities back home; they have grown almost six-fold to USD 689 billion<sup>76</sup> in the past twenty years, represent four times the net official development assistance and official aid received globally<sup>77</sup>, and are a vital source of income for developing countries. For example, in 2018, the Philippines were the fourth largest remittance recipient globally with USD 34 billion remittance inflows, or about 10% of its GDP.

There is a strong association between remittances and poverty reduction, not only from the direct increase in household income but also from the improvement of health, education, and economic outcomes in recipient communities<sup>78</sup>. Today's remittances payments infrastructure still largely rests on the so-called correspondent banking system of the 1970s, an intricate array of intermediary banks moving funds, and charging fees, between the sender and the recipient. Key cost drivers of the remittance market are the lack of competition in certain corridors, regulatory issues, and a complex payment infrastructure. It then follows that enhancing the effectiveness of the remittance market, by reducing costs and increasing access, may not only enable a more efficient market, but also advance the international development agenda; indeed, cutting transaction cost by 5% can save up to USD 16 billion a year<sup>79</sup>.

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<sup>75</sup> International Organization for Migration. *World Migration Report 2020*. 2019. [https://read.un-ilibrary.org/migration/world-migration-report-2020\\_b1710e30-en#page26](https://read.un-ilibrary.org/migration/world-migration-report-2020_b1710e30-en#page26), accessed July 22, 2020.

<sup>76</sup> Ibid.

<sup>77</sup> <https://data.worldbank.org/indicator/DT.ODA.ALLD.CD>, accessed July 22, 2020.

<sup>78</sup> Mohapatra, S., Ratha, D. *Remittance Markets in Africa*. Washington, DC: World Bank, 2011.

<sup>79</sup> <https://remittanceprices.worldbank.org/en>, accessed July 22, 2020.

With fintech unfolding, the remittance industry saw a shift to digital with start-ups developing new cross-border payments messaging and settlement systems. The most notable of them is Ripple's, a US technology company, and, in ASEAN, Nium, a Singapore based start-up founded in 2014, has become one of the fastest-growing digital remittance companies<sup>80</sup>.

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<sup>80</sup> Koh, A., Fernandez, D., Cheah, S.M. Nium: Leveraging Fintech to Disrupt Cross-Border Remittance Services, *Sim Kee Boon Institute for Financial Economics, Singapore Management University* (2020).

*Box 5 Collateralized Lending to Farmers in Myanmar — a Singapore Fintech*

Myanmar is one the poorest nations in Southeast Asia, suffering from decades of internal conflict, stagnation, mismanagement, and isolation. Myanmar's Human Development Index (HDI) — a measure of human development summarizing life expectancy, access to knowledge, and standard of living, stands at 0.584 in 2018, positioning Myanmar at 145 out of 189 countries<sup>81</sup>. The country's GDP per capita lags those of the other countries in the CMLV (Cambodia, Myanmar, Laos, Vietnam) group at USD 1,400.

Founded in 2015, Singapore start-up InfoCorp Technologies aims to bring inclusive financial services to the livestock industry by unlocking the so-called dead capital of the unbanked<sup>82</sup>. Dead capital represents assets owned by poor or middle-class people in emerging economies, capital trapped in the informal sector of the economy and which cannot be monetized due to poor infrastructure, policies or bureaucracy; it is estimated at about USD 10 trillion globally<sup>83</sup>. Some argue that these assets could foster development if they were, first, recognized and then brought into the mainstream market economy<sup>84</sup>.

InfoCorp believes that its "AgriTech" solution, supported by blockchain technology and IoT devices, can help uniquely identify livestock (by inserting a digital chip into the animal), formalize in a public ledger the until-then informally-held property rights of the farmer, and subsequently obtain cattle insurance and credit in the form of a collateralized loan. In 2018, it

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<sup>81</sup> United Nations. 2019 Human Development Report. Briefing note, Myanmar. [http://hdr.undp.org/sites/all/themes/hdr\\_theme/country-notes/MMR.pdf](http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/MMR.pdf), accessed July 24, 2020.

<sup>82</sup> Infocorp, <https://infocorp.io>, accessed July 24, 2020.

<sup>83</sup> De Soto, H. *The Mystery of Capital*. UK: Black Swan, 2001.

<sup>84</sup> Bafort, L. Unlocking the Dead Capital. World Bank. 2010. <https://www.worldbank.org/en/news/opinion/2010/11/18/Unlocking-the-Dead-Capital>, accessed July 24, 2020.

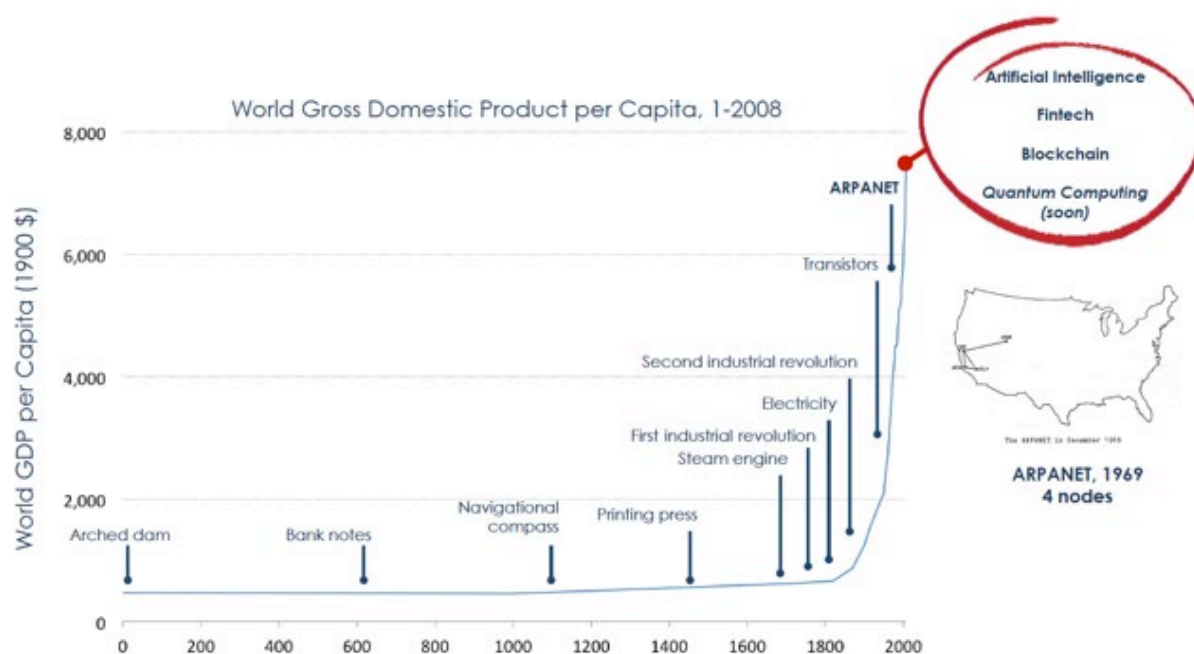
signed an agreement with the Myanmar Ministry of Agriculture<sup>85</sup> and Myanmar Insurance<sup>86</sup>, an arm of the Ministry of Planning and Finance, to pilot its solution.

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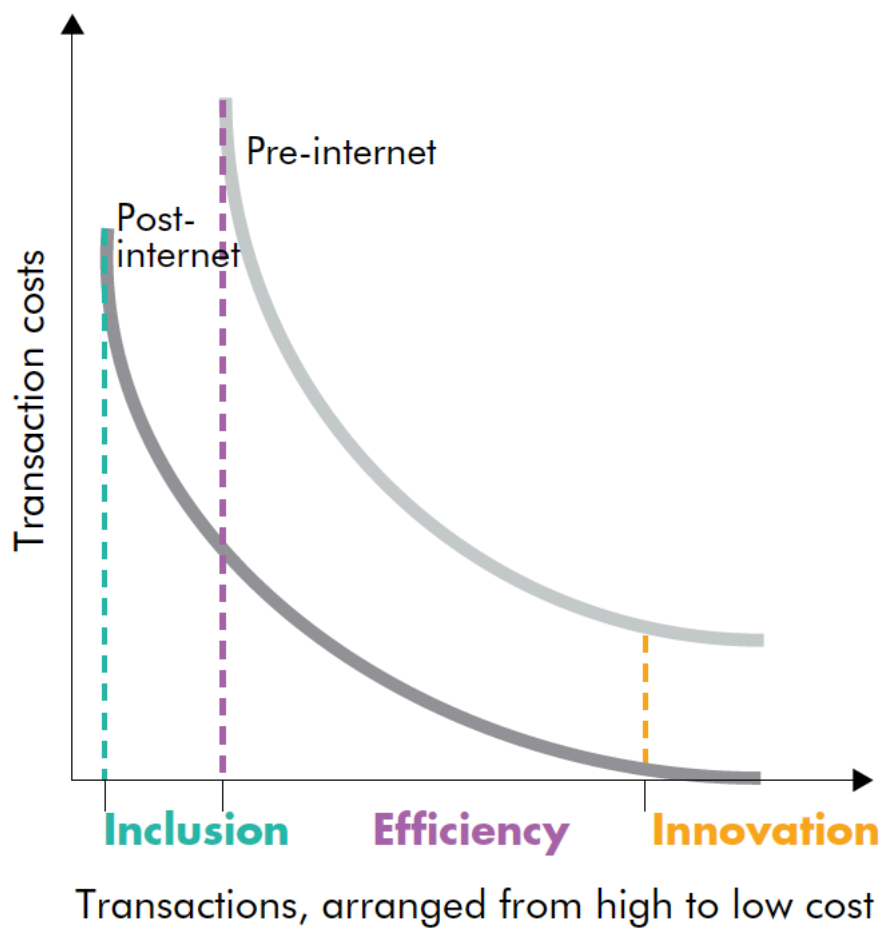
<sup>85</sup> "Government partners with Fintech firms to enable use of livestock as collateral." Myanmar Times, May 17, 2018. Accessed July 24, 2020. <https://www.mmtimes.com/news/government-partners-fintech-firms-enable-use-livestock-collateral.html>

<sup>86</sup> "Livestock insurance to be launched by year-end." Myanmar Times, August 16, 2018. Accessed July 24, 2020. <https://www.mmtimes.com/news/livestock-insurance-be-launched-year-end.html>

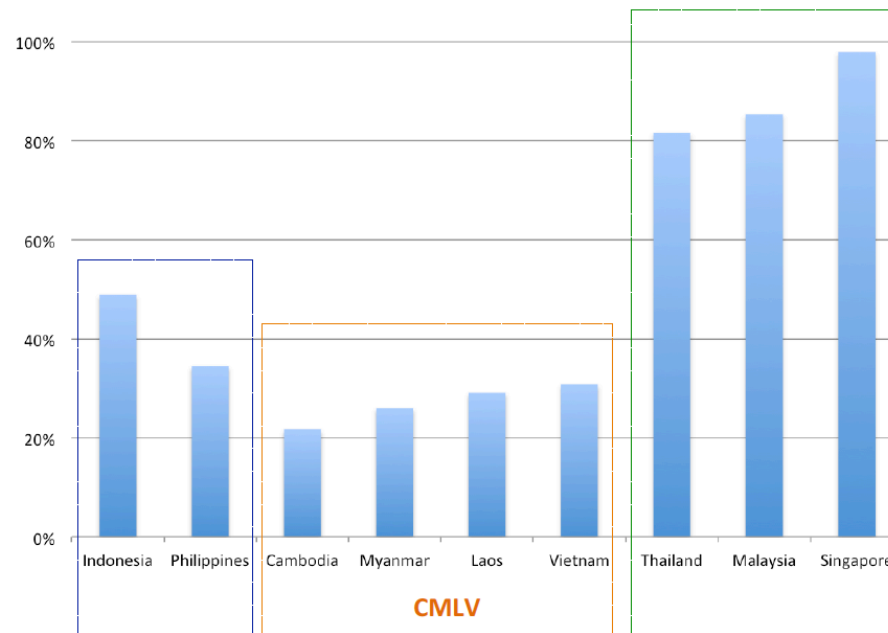
## Figures

Figure 1 *World GDP and Selected Technological Breakthroughs*

Sources: Maddison, 2007. Maugen, 1997. Author's.

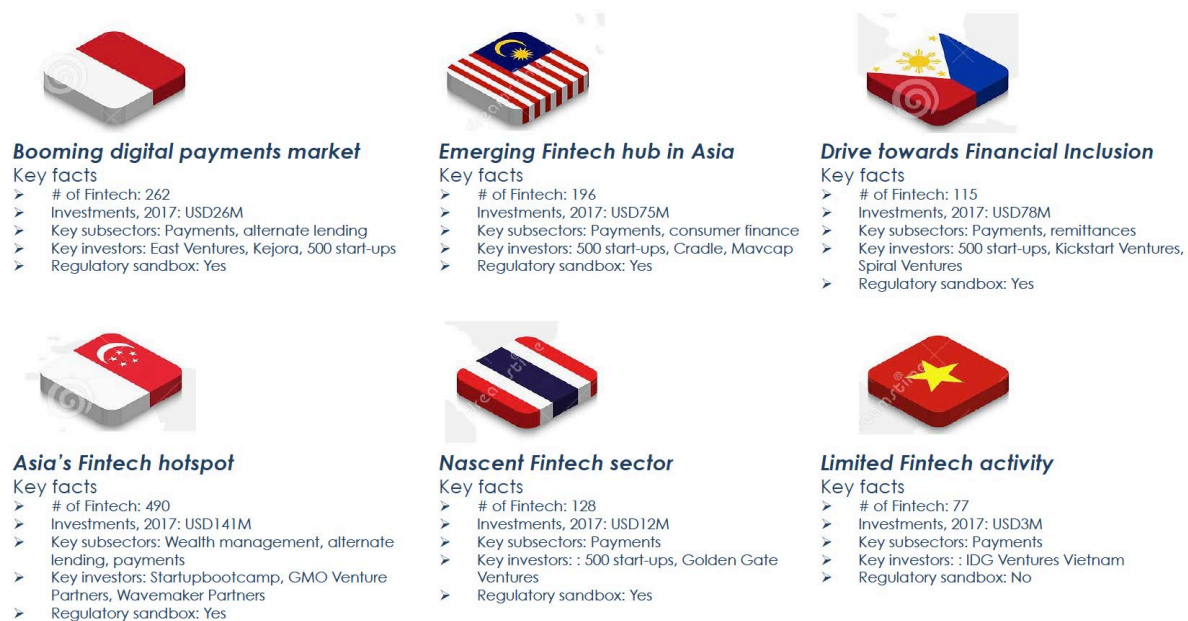
Figure 2 *Economic Development and Digital Technologies*

Source: World Bank, 2016.

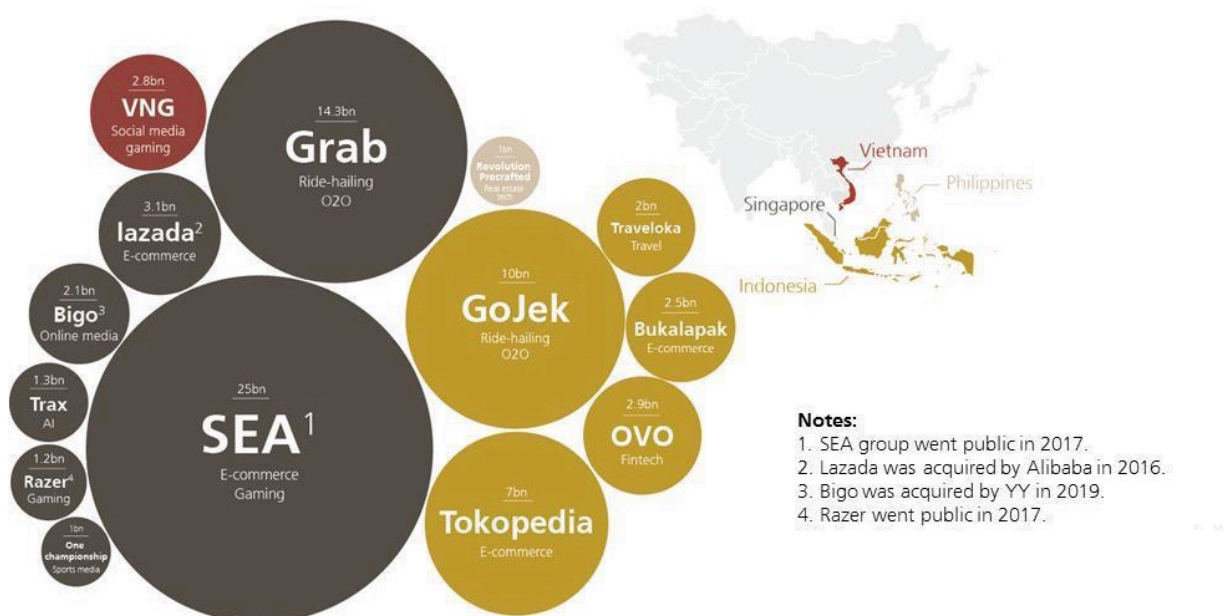
Figure 3 *Access to Financial Services in ASEAN*

Source: World Bank 2017 Global Findex Database.



Figure 4 *ASEAN Fintech Start-up Snapshot*

Sources: Tracxn, 2017. Fintech Singapore 2018.

Figure 5 *ASEAN's Unicorns*

*Note: As of May 2020.*

*Sources: CB Insights, media reports, UBS.*

Figure 6 *Financial Services Offerings of Ant Financial*

Sources: Alibaba, Ant Financial, <https://www.antfin.com/family.html>, accessed September 16, 2019.